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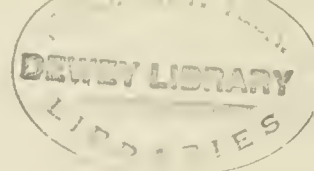


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I/S CHARGE-OUT SYSTEMS: OPTIONS AND
PERSONNEL IMPLICATIONS

by

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WP# 1479-83

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INTRODUCTION

Over the coming decade market competition will require that Information Systems (I/S) charge-out systems be based on competitive market prices. Gone are the days when I/S were the quasi- exclusive domain of comptrollers' offices. I/S users now include a wide range of departments and/or divisions. Computer automation and rationalization is no longer limited to financial planning, spread sheets and pay checks. Management decision making is more and more frequently linked to corporate data bases, including decision support software. Paralleling the expansion of I/S applications has been a shift from a supply-driven to a demand-driven I/S environment. As more user departments encroach on the turf of the I/S professional, it becomes less feasible for I/S departments/divisions to dictate the terms of their products and services.

User sophistication and the proliferation of mini- and micro-computers combine to render simple cost-displacement I/S charge-out systems obsolete. I/S departments already find themselves pressured to focus on greater efficiency and cost-effectiveness. If internal I/S departments are unable to supply their users as

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adequately as the market would dictate, those users will start turning to outside vendors to fill their I/S needs.

The purpose of this paper is to evaluate the merits of competitive pricing-based charge-out systems in the context of changing user needs, increasing pressures for competitive I/S services, and the growing role of I/S within a wide variety of firms and industries. We begin with a review of alternative charge-out systems, paying particular attention to market pricing techniques. The next section discusses the organizational impact of competitive charge-out systems and their effects on I/S personnel. Following is a consideration of some potential disadvantages of such techniques. Finally, we conclude with a few suggestions concerning the implementation of competitive charge-out techniques within the changing I/S environment.

ALTERNATIVE CHARGE-OUT SYSTEMS

The primary purpose of any I/S charge-out system is to control computer budgets. For this reason, such systems are usually introduced only after the I/S department has developed beyond the stages of its initiation and expansion to dimensions appropriate to servicing the firm's user needs. By this time users have usually overcome their initial resistance to the introduction of alien computer technologies. Indeed, the reason for run-away computer costs is usually an unbridled increase in user demands.

At this point management must formalize and try to control their information system(s). This involves at least the recovery of computer costs, which in itself begins to limit demand. I/S may then reach a final stage in which the systems are "mature" enough to

warrant more sophisticated user interfaces. Under these circumstances, users may already be implementing distributed processing, decision support systems (DSS) or CAD/CAM. The demands placed on I/S in such cases make it necessary to adjust for differences in the intensity of user demands over time, and for the bottlenecks that result from inadequate I/S resource allocation during peak demand periods.

Charge-out systems can be designed to affect the distribution of I/S operations, equipment, overhead, and personnel costs. They are ultimately intended to satisfy users both by increasing I/S efficiency and by setting guidelines for the orderly organization of user work schedules.¹ But the supply and demand characteristics of I/S services are unique and complex. On the supply side, the ratio of fixed to variable costs is high; computers that do not operate at full capacity will be disproportionately expensive to users. Moreover, demand tends to intensify at certain times of the year (e.g., before year-end reports are due), thus overloading systems just when they are needed most.

There are four generic types of charge-out system, not all of which deal effectively with these supply/demand problems. These methods are called: 1. Overhead, 2. Full Cost Recovery, 3. Market Pricing, and 4. Flexible Pricing. The first is not really a charge-out system per se. Instead, users are charged a fixed percentage of their respective departmental budgets, regardless of how much use they make of the I/S department. The main disadvantage

¹ Stibbens, S., "MIS Budgets Are Dreams Until They're Funded," in Infosystems, Vol. 29, June 1982.

of such a charge-out structure is that if users cannot balance the expected benefits of their software development projects against costs, they will have no standard by which to gauge the soundness of their business decisions. The overhead system can only function adequately in cases where the steering committee or senior manager responsible for I/S services is capable enough skillfully to assign I/S priorities and to value projects comparatively.

The cost-recovery method is only slightly more sophisticated. In this case users are charged certain rates per unit of usage; total costs for some time period are divided by, e.g., total CPU time used, and each user department is charged accordingly. The primary disadvantage of this system is that costs to users will be highest when computer usage is lowest. This may discourage use, thus raising costs even further. Moreover, this method fails to supply I/S departments with any incentives to lower costs at their end, since users pay total I/S costs regardless of I/S efficiency.

Flexible pricing methods are intended to stabilize demand by charging higher prices during peak periods or for rush jobs. Prices are either based on the market, or set to cover costs. The main problem with flexible charge-out systems is that prices often change so frequently as to confuse and/or discourage users.

Market pricing techniques avoid most of the difficulties inherent in the above-described systems. They can be implemented best in I/S departments/divisions that are run as separate profit centers. Here, I/S services cost roughly what they would if they had been purchased from software or timesharing vendors. The most obvious advantage of this method is that -- at least hypothetically -- users pay as little for I/S services as the market allows. If the

relationship between I/S and users can be structured in such a way as to ensure competitive I/S prices, this system has a good chance of working to everyone's advantage. The chances of success are particularly high if managements' philosophy emphasizes departmental/divisional profit responsibility.

As noted above, I/S charge-out systems are intended to accomplish a variety of objectives. Most generally, they are meant to maximize the benefits of data processing by allocating I/S resources as effectively and inexpensively as possible. This involves increasing user involvement while at the same time regulating demand, facilitating management planning and satisfying legal or contractual requirements.² This set of goals comprises a tall order. Not surprisingly, different charge-out systems meet these requirements in varying degrees.

COMPETITIVE CHARGE-OUT SYSTEMS: ORGANIZATIONAL & PERSONNEL IMPACT

Successful I/S managers are capable of sustaining high-quality service levels.³ To do this, they find ways of providing their divisional or departmental subordinates with incentives to please user departments. Market-pricing charge-out systems structure personnel evaluations so as to emphasize efficient I/S services, an adequate user interface and a reasonable measure of user

²Olson, M. and B. Ives, "Chargeback Systems and User Involvement in Information Systems -- An Empirical Investigation," MIS Quarterly, June 1982.

³Rockart, John F., Leslie Ball and Christine Bullen, "Future Role of the Information Systems Executive," MIS Quarterly, Special Issue, December 1982.

satisfaction. As such, they are capable of supplying I/S personnel with incentives to please users.

The implementation of such a system is facilitated by certain inherent competitive advantages of internal I/S departments. First, I/S can offer lower costs than the market would dictate. Internal I/S departments can easily become familiar with user needs, while outside vendors need time (and charge for that time) to find out about users' objectives. In other words, internal I/S departments can take advantage of knowledge economies of scale, given their prior understanding of data sources, interface structures and user imperatives. Second, software vendors may not have timesharing facilities. This may also incline users toward paying their own I/S departments to manage computer facilities, to amend and maintain databases and to interface with data sources. Finally, users will usually prefer internal I/S departments in the interest of project confidentiality and security.

Notwithstanding these inherent advantages, internal MIS is not always as efficient or satisfactory as outside vendors can be. In this case service-objective charge-out systems -- where price competitiveness is taken for granted -- can be of great help to user departments. The first steps in the creation of such a system are to determine the cost functions of I/S, and to establish how software vendors charge for their services. System development involves the costs of investigation, specification, design, program coding and testing, and system testing and conversion. Vendors usually apply time and materials charges for development costs, especially when it is not yet clear that a given system will actually be developed to completion. Once a system has been specified, fixed charges are

usually more appropriate. At this point, users will probably want to compare bids. Since internal I/S departments have certain intrinsic advantages over outside vendors (among other reasons, because of the proximity that facilitates on-site consulting) they should be able to submit highly competitive bids.

System operations costs derive from database management, computer usage, keypunching, report printing and storage costs. Vendors usually charge either standard resource rates or rates per unit processed for these services. The latter are more appropriate when users have not developed routines that allow for accurate estimates of operations costs. Since operating costs are usually shared among different user groups, the various applications should all be assigned a portion of operating and maintenance costs (e.g., a master file of securities, or brokerage firm prices).

Support costs involve all the overhead costs of running an I/S department. Among these are project planning, hardware installation, job scheduling, support software (forms design) and documentation. These costs will be recovered through both development and operating charges, either directly or by fixed monthly service rates.

If an internal I/S department follows along the lines described above -- if its structure resembles that of an outside vendor -- it will also have to take on a series of functions not usually associated with I/S. Most importantly, it will be necessary to consider sales and marketing techniques that will sustain internal business and maintain competitiveness with outside vendors. Furthermore, if I/S consults with user groups it may be helpful to reward consultants in such a way as to give them incentives to meet user needs as fully as possible. These consultants would then have

to justify their time and energy both to their own supervisors and to user departments. It may also be useful to install a customer service group to provide on-the-spot training and/or trouble shooting, both in the interest of increasing user satisfaction. Finally, competition may demand an I/S group to keep abreast of the latest technological advances that may be of interest to user departments.

These structural changes in the management of I/S will be paralleled by changes in I/S personnel management. Because competitive charge-out systems force I/S to keep costs low, personnel must be provided with incentives to produce quality services on time. At the same time, user groups will be more involved in software development and maintenance. This will require better human relations skills (as well as skills relating to every other aspect of the "user interface") at all levels of I/S.

Several technological changes in the I/S field forcefully imply that the role of the "user liaison" will be increasingly important. Three trends deserve particular attention here: the increasing role of distributed processing, the use of more and more standardized software packages, and the increasing popularity of end-user computing. These trends combine to imply a need for closer business and interpersonal relations between users and I/S professionals. User sophistication has already begun to manifest itself in a wide range of I/S-related areas. At the same time, I/S departments must become more familiar with the business-related aspects of their user departments and with the functional requisites that underlie the symbolic packages they offer their user departments.

POTENTIAL DISADVANTAGES:

The most striking effect of a dramatic change in the structure of an I/S charge-out system is loss of control. The increased involvement and importance of user groups can undermine the economies of scale (for hardware or software) that derive from I/S centralization, thus intensifying user interface problems. Both of these dangers are inherent in a structure that does not clearly delineate responsibility for inter-systems communications. For this reason, a more decentralized structure will require that I/S create standard procedures for addressing problems deriving from conflicting user applications. It may be necessary to create a central I/S staff function to monitor the potential for this type of inefficiency.

User interface issues also require careful I/S structuring, possibly including the creation of oversight groups that can minimize user conflicts. It will probably be inherently easier for an internal I/S department to undertake such coordination than it would be for an outside vendor. On balance, the sort of problem that concerns the efficiency, quality and cost-effectiveness of I/S should not pose any insurmountable barriers to I/S's becoming competitive with outside vendors. The advantages of proximity to and familiarity with user departments should more than counter-balance the disadvantages of restructuring I/S along competitive lines.

But I/S personnel pose a more obscure set of problems. To require a group of technology-oriented professionals suddenly to focus on market imperatives requires subtle and adept human resource management (HRM) skills. Furthermore, the I/S management team will be wise to consider these problems before implementing a series of structural changes that might alienate their subordinates. Since I/S

professionals are in high demand and short supply, since their turnover rates often can exceed 25% annually, and since these circumstances are likely to intensify before they abate, neither I/S nor top management can afford to ignore the likely reactions of their computer professionals.

The standard understanding of I/S personnel casts them as anti-social types who resent excessive contact with colleagues and/or supervisors. If this conception were accurate it would be hard to monitor their motivations and anticipate the personnel-related effects of structural changes in I/S departments or divisions. But in fact our research indicates that I/S professionals would actually like more contact with their employees and managers around issues of career development. Our findings suggest that there is a good deal more scope for managerial structuring of I/S functions and careers than is typically believed to be the case. Armed with an understanding of I/S professionals' motivations, management can probably anticipate their reactions to a restructuring of I/S as a profit center, thus easing the transition considerably.⁴

CONCLUSIONS

The growing sophistication, involvement and power of users has presented I/S groups with a new set of demands. These demands require that I/S departments develop market-competitiveness largely through service skills.

Competitive charge-out systems perform the increasingly essential function of making computer services cost-effective. The

⁴Barocci, T. A. and K. R. Wever, "Information Systems Careers and Human Resource Management," MIT Sloan School of Management Working Paper #1482-83, September 1983.

ultimate goal is user satisfaction. The process involves the implementation of equitable and efficient information systems through a careful juggling act, balancing the various costs of supplying unique I/S services against the changing demands of the users who buy them. Few firms can still get away with overhead or full cost recovery charge-out systems. Where such systems are in place, they will probably become inadequate in the near future as users discover their inherent inefficiencies and expenses. There is an even more fundamental reason why top management must recognize the pitfalls of archaically structured charge-out systems: users cannot make sound I/S-related business decisions if they are unable to balance I/S costs against expected benefits.

Competitive I/S charge-out systems do not appear to pose any serious structural obstacles to the internal I/S department. If anything, I/S groups can afford to be less efficient than outside vendors while still charging competitive prices. But the service objectives of a market-charge-out method do not allow for the same kind of slack. Sales, marketing, and user-liaison consulting will all be part of the competitive package. These innovations will entail business and human resource acumen on a scale challenging purely technology-oriented I/S departments/divisions.

The word "system" was first applied to human relations in the behavioral science literature of the '40s and '50s. The management of information systems is more and more a matter of human relations. The dynamics of the I/S field and the role of I/S within business organizations are not primarily the domain of technical expertise. The structural relations between I/S, users and top management -- like the motivations, needs and potential contributions of I/S

professionals -- are in large measure the materials of human resource managers. The organizational set-ups that effectively allocate I/S responsibilities and resources are rooted in the relations within I/S departments and between I/S, users, and top management. Competitive charge-out systems anticipate and adapt themselves to precisely this context.

Adams, Donald L., "Survey of Computer Cost Allocation Techniques."

Allen, Brandt, "An Unmanaged Computer System Can Stop You Dead," Harvard Business Review, November-December 1982, pp. 77-87.

Barocci, T.A., and Cournoyer, Paul E., "Make or Buy: Computer Professionals in a Demand Driven Environment," Working Paper 1342-82, Sloan School of Management, M.I.T., September 1982.

Barocci, T.A., "MIS/HRM Speech Outline," 6/8/83

Bologna, Jack, "Managing High-Tech Employees: Perceiving Their Unique Characteristics is Half the Battle," Computerworld, September 13, 1982, pp. 62-63.

Bulkeley, William M., "Microcomputers Gaining Primacy, Forcing Changes in the Industry," The Wall Street Journal, Thursday, January 13, 1983, p. 33.

Buss, Martin, D.J., "Managing International Information Systems," Harvard Business Review, September-October 1982, pp. 153-162.

Cheeseborough, Pamela H., and Davis B. Gordon, "Planning a Career Path in Information Systems," Working Paper Series, Management Information Systems Research Center, Graduate School of Business Administration, University of Minnesota, May 1981.

Crane, Janet, "The Changing Role of the DP Manager," Datamation, January 1982, pp. 97-108.

Davis, John J., "An EDP Cost Center - A Company Within A Company," S.A.M. Advanced Management Journal, Summer 1976, pp. 34-38.

Froehlich, Allan F., "Managing the Data Center as a Business."

Gibson, Cyrus F., and Richard L. Nolan, "Managing the Four Stages of EDP Growth," Harvard Business Review, January-February 1974, pp. 76-88.

Goldstein, David K., "The Effects of Structured Development Methods on the Job Satisfaction of Programmer/Analysts: A Theoretical Model," Working Paper 1130-82, Sloan School of Management, Center for Information Systems Research, M.I.T., May 1982.

Goldstein, David K., "A Further Examination of the Determinants of Job Satisfaction in Program/Analysts," Working Paper 1370-83, Sloan School of Management, Center for Information Systems Research, M.I.T., November 1982.

Grindlay, Andrew, "Very Senior Managers: What Is Their Role In Managing DP?," Business Quarterly, Winter 1982, pp. 9-12.

Johnson, Bob, "DP Executives Offer Map to Top," Computerworld, July 19, 198_, p. 2.

Karten, Howard A., "People Relationships Seen Key to Manager's Job," Computerworld, June 18, 1979, p. 12.

Keys, Bernard and Robert Bell, "Four Faces of the Fully Functioning Middle Manager," California Management Review, Summer 1982, pp. 59-67.

Kull, David, "Keep the Boss Happy: Organizations Expect More Than Processed Data From Their Information Executives These Days. What They Really Want Is Leadership." Computer Decisions, November 1982, pp. 174-180.

Lasden, Martin, "Avoid Political Traps: Play The Game To Win," Computer Decisions, July 1981, pp. 135-140.

Lauer, Peter H., and Richard D. Sbarbaro, "Recruitment: Who Will Lead the Computer Revolution?" Personnel Journal, October 1982, pp. 736-738.

Lauer, Peter H., and Richard D. Sbarbaro, "MIS Executives Face Changing Times," Financial Executive, August 1981, pp. 22-26.

Leffel, Daniel L., "Introduction to Business Information Management," presented to CISR, Sloan School of Management, M.I.T., November 15, 1982.

Leontiades, Milton, "Choosing the Right Manager to Fit the Strategy," The Journal of Business Strategy, pp. 58-69.

Mallory, Joseph S., "The Rising Tide of Information Management,"

Martin, Josh, "Choosing a Management Style," Computer Decisions, December 1981,

Mathias, James E., "Data Communications Management: Future Developments," Journal of Systems Management, November 1982, pp. 8-13.

McConkey, Dale and F.D. Barrett, "Managing In The Age Of The Robot," Business Quarterly, Winter 1982, pp. 40-46.

McKenney, James L., and F. Warren McFarlan, "The Information Archipelago - Maps and Bridges," Harvard Business Review, September-October 1982, pp. 109-119.

Miller, Guy E., "A Method for Forecasting Human Resource Needs Against Internal and External Labor Markets," Human Resource Planning, Volume 3, Number 4, 1980, pp. 189-200.

Myers, Edith, "Attack of the Micro," Datamation.

Nolan, Richard L., "Managing Information Systems By Committee," Harvard Business Review, July-August 1982, pp. 72-79.

Pitagorsky, George, "Industry Caught Up in Avoiding Change."

Price, Margaret, "MIS Still Outside the Inner Circle," Industry Week, November 1, 1982, pp. 51-54.

Quillard, Judith and Dale Goodhue, "Information Resource Management," prepared as a discussion draft for the CISR Endicott House Seminar, November 15-17, 1982, Center for Information Systems Research, Sloan School of Management, M.I.T.

Rochester, Jack B., "New Computer Architectures," Computerworld.

Ruth, Stephen D., "Computer Managers of the '80's: Only Generalists Need Apply," Journal of Systems Management, June 1981, pp. 26-29.

Seaman, John, "Up the Organization," Computer Decisions, June 1981, pp. 89-102.

Stone, Jack, "Reorganization Should Give DP More Clout," Computerworld, February 11, 1980, pg. 31.

Thackray, John, "You Can't Play if You Don't Know How," Datamation, October 1982, pp. 90-96.

Tichy, Noel M., Charles J. Fombrun, and Mary Anne Devanna, "Strategic Human Resource Management," Sloan Management Review, Winter 1982, pp. 47-61.

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